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Research Article

### KNOWLEDGE & PRACTICE ABOUT ADMINISTRATION OF HIGH ALERT MEDICATION IN THE TERTIARY CARE HOSPITAL IN LAHORE

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**Abstract:**

*High alert medications are enlightened as those medicines that bear the maximum threat of causing major patient harm when administered incorrectly. Nurses are accountable for the administration of high alert medication; inappropriate administration can show a substantial clinical result and at times can be deadly for the patients. High Alert Medication is commonly used in the emergency room, intensive care unit, pediatric ward and medical ward. Because high alert medication is used in emergency situations, they bear a heightened risk of causing patient harm when used incorrectly. Some high alert medication has a narrow therapeutic index e.g., warfarin, when used improperly, rapidly causes the undesirable side effect of bleeding. Further, well-known chemotherapeutic agents, such as vincristine, require special handling, and should be administered according to the manufacturer's recommendation. (Sa'ed et al., 2019) Current investigation targeted to evaluate the level of knowledge of high alert medication among nurses in tertiary care hospital. A quantitative, descriptive cross-sectional study design was used to explore the level of knowledge and regulations of high alert medication and obstacles faced by nurses during the administration of high alert medication in tertiary care hospital. The instrument used for the data collection was adopted questionnaire and convenient sampling technique was used. Outcome of current study deliver confirmation that nurses have deficient knowledge of high alert medication and its administration and regulation. Deficiency of knowledge was the significant obstacles that nurses faced during administration of high alert medication. Participants reported that conflicting views between nurses and doctors, were the most commonly encountered obstacles during administration of high alert medication these contribute to the possibility of Medicine Errors.*

**Key Words:** High Alert Medication, knowledge, regulations, obstacles.

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## INTRODUCTION:

High alert medications (HAMs) are considered to be one which are associated with a high risk of serious harm, if administered improperly, and are responsible for the majority of harmful error. Nurses are responsible for administration of High Alert Medication (HAMs); incorrect administration can have a significant clinical outcome, and at times can be fatal.

High Alert Medication (HAMs) is commonly used in the emergency room (ER), intensive care unit (ICU), pediatric ward and medical ward. As High Alert Medication (HAMs) is used in emergency situations, they bear a heightened risk of causing patient harm when used incorrectly. Some High Alert Medication (HAMs) has a narrow therapeutic index e.g., when used improperly, rapidly causes the undesirable side effect of bleeding. Further, well-known chemotherapeutic agents, such as vincristine, require special handling, and should be administered according to the manufacturer's recommendation. (Saeed et al., 2019) According to the Institute of Medicine in the USA, adverse drug events occur in 6%–10% of all hospitalized patients. When these adverse events involve high-alert medications, patients are at a greater risk of suffering serious harming (Corcoran 2007). Safe practices; during prescribing, dispensing and administration of these medications can reduce the potential harm to patient (Saeed et al., 2019)

Intravenous (IV) medication errors are a common type of error. Identified in hospitals and can lead to considerable harm. Over the past 20 years there have been several hundred FDA reported incidents involving IV pumps, many of which have led to patient deaths. (Tang et al., 2015) According to the Institute of Medicine year of reports, 7,000 deaths each year are attributed to preventable medication errors. The definition of a high-alert medication is a "medication that bears a heightened risk of causing significant patient harm when used in error." This does not imply that errors occur more often with high-severe and even fatal. In the Mid 90s, the Institute for Safe Medication Practices (ISMP) examined the drugs that were most likely High alert (HA) medications than other medications but rather, when an error does occur, the consequences can be to cause harm to patients. (Report refer hence, institute and year).

A review of medication error incidents reported between 2005 and 2010 to the National Reporting

and Learning Service indicated that 0.5 Million such incidents had occurred in England and Wales over this period (Cousins et al., 2012). A total of 86,821 (16%) of these incidents caused actual patient harm, of which 822 (0.95%) resulted in death or severe harm (Cousins et al 2012). The cost to the National Health Service hospital admissions related to medication errors in 2007 was £770 million and between 1995 and 2007, £5 million was spent on litigation costs (Frontier Economics 2014). In the UK, one third of medication errors occurring in general medical practices related to prescribing errors. Many of these were the result of poor communication, particularly with regard to the prescription of antibiotics to which patients are known to be allergic (Patey et al., 2007). Medication errors contribute to adverse events that compromise patient safety and place a large financial burden on health systems (Lo, et al, 2013)

## Significance/ Aims & Objectives:

This study will increase knowledge and improve practice among nurses regarding high alert medication. This study will be helpful to improve standard of care among staff nurses. Moreover, this study will support hospital management to maintain and improve strategies regarding medication error.

## LITERATURE REVIEW:

A cross-sectional study was conducted in 2006 in Taiwan during which author evaluated nurses' information of high-alert medications and analyses famed administration errors solely 3•6% of nurses thought of themselves to own sufficient knowledge about high-alert medications, 84•6% hoped to achieve a lot of coaching, and also the leading obstacle reported was short information (75•4%). a complete of 184 famed administration errors were identified, as well as wrong drug (33•7%) and wrong dose (32•6%); 4•9% (nine cases; 9/184) resulted in serious consequences (Hsaio et al., 2010). A study was conducted in 2015, in West Bank, Palestine. The response rate was 93. Nurses were found to own scant information concerning HAMs; sixty seven.1% of participants had a score of but seventieth, with a mean total score of fifty nine.9±15.1, with a p-values<0.001. 81.8% of respondents hoped to get extra coaching. The obstacles reportable were inconsistent opinions between doctors and nurses (37.9%), and no established customary procedure for HAMs (37.1%) level of information of HAMs among nurses in government hospitals in geographic area, Palestine. (Sa'ed et al., 2019)

IN 2008 Unit of contractile organ Nursing, University of metropolis, Chapel Alpertion Hospital, Leeds, GB study was conducted and also the result show that almost all participants gave satisfactory answers to dose, indications and side-effects however scored very poorly on mechanism of action and drug interactions. General reasons for low response included: (i) absence thanks to long sickness and maternity leave, (ii) knowledge assortment happening within the winter season once the hospital was very busy, implying that some nurses might not have had time to participate and (iii) an enquiry methodology involving interviews. (M. Ndosi & Newell, 2010) Medication errors related to IV pumps occur of times, have the potential to cause damage, and are epidemiologically numerous. Sensible pumps are a necessary element of a comprehensive safe medication system. However, presently accessible sensible pumps will fail to come up with purposeful enhancements in patient safety till they will be interfaced with alternative systems like the electronic anamnesis, processed prescriber order entry, bar coded medication administration systems, and pharmacy info systems. Future analysis ought to specialize in the effectiveness of recent technology in preventing latent and active errors, and on new sorts of error that any technology will introduce. (Husch et al., 2005)

A study was conducted in Ahmadabad tertiary care hospital Asian country accreted with JCI and NABA to scale back the medication error associated with high alert medication Data of high alert medication errors throughout could 2017 to August

2017 were collected. The proportion of incidence and severity of high alert medication error were known and calculated. . analyzed the high alert medication errors and calculate the speed of errors. (Kapadia, Raval, & Gadhav, 2017).

### METHODOLOGY:

The cross-sectional descriptive study design was used in this study. A self-administered questionnaire was distributed among staff nurses of mayo hospital Lahore to assess the KNOWLEDGE AND PRACTICE OF HIGH ALERT MEDICATION. staff nurses of mayo hospital were the target population mainly composed of 157 staff nurses. The inclusion criteria were staff nurses and exclusion were not included the students' nurses, trainee, any health professionals. Participants were selected through convenient sampling techniques. Sample size was 113 according to solvin s formula sample collection. questionnaire was consisted of 38 questions including 8 from drug adminsrtration, 8 from regulation 14 from obstacles and remaining from knowledge and training needs. Data analysis by SPS version 21. confidentiality and privacy of the participants was considered. The participant were informed about the objectives of the study.

### SAMPLE SIZE FORMULA

$$n = \frac{N}{1 + N(E)^2}$$

n= sample size  
N=target population  
E= margin of error  
 $n = \frac{157}{1 + 157(0.05)^2}$   
 $n = \frac{157}{1 + 157(0.0025)}$   
 $n = \frac{157}{1 + 0.392}$   
n=113

### RESULTS:

Table No: 4.1 Demographic data of undergraduate nurses.

Profile		(f)	%
Age	< 25 Years	23	20.4
	>25-30 Years	54	47.8
	>30-35 Years	19	16.8
	>35 Years	17	15.0
Gender	Male	8	7.1
	Female	105	92.9
Qualification	Diploma Nursing	83	73.5
	Bachelors	22	19.5
	Master MSN	8	7.1
Unit Experience	< 2 years	26	23.0
	>2-5 years	55	48.7

	>5-10 years	22	19.5
	>10 years	10	8.8
ICU training	Yes	67	59.3
	No	46	40.7
Job experience	< 2 years	19	16.8
	>2-5 years	49	43.4
	>5-10 years	25	22.1
	>10 years	20	17.7
ER training	Yes	81	71.7
	No	32	28.3

Table No 4.1 displays that 92.9% of the respondents' were female and 7.1% were male

Among 113 participants (n=23)20.4% participants were between <25years, with the mean of 2.27. An entire of 83 (73.5%) participants were from Diploma Nursing but (n=22) 19.5% were in the Bachelors. A total (n=55) 48.7% of respondents were >2-5 years of unit experience, while (n=26) 23.0% were have < 2 years of unit experience. Almost (n=67) 59.3 participants have ICU training. Most of the participant (n=81) 71.7% have ER training.

**(Table 4.2) Nurses Knowledge about Administration of High Alert Medication**

Variable	Yes (f)%	No (f)%	Don't know (f)%	Mean & SD
Fast IV pushes 1: 1000 epinephrine 1 ampule for patient who has mild allergic reaction.	(81)71.7%	(30)26.5%	(2)1.8%	1.30 $\pm$ .498
When an emergency happens, fast IV push 10% CaCl <sub>2</sub> 10mL in 1–2 min	(48)42.5%	(60)53.1%	(5)4.4%	1.62 $\pm$ .572
10% calcium gluconate 10% Cacl are the same drugs and interchangeable.	(33)29.2%	(65)57.5%	(15)13.3%	1.84 $\pm$ .635
Cc and ml are the dosage expression for insulin injection	(21)18.6%	(79)69.9%	(13)11.5%	1.93 $\pm$ .546
Insulin syringe can be replaced by 1ml syringe	(44)38.9%	(58)51.3%	(11)9.7%	1.71 $\pm$ .636
When an emergency happen such as ventricular fibrillation, fast 15% KCL 10ml given iv	(46)41.7%	(53)46.9%	(13)11.5%	1.71 $\pm$ .666
15%kcl is better added to ringer lactate solution for rapid infusion in case of dehydration	(60)53.1%	(45)39.8%	(8)7.1%	1.54 $\pm$ .627
Fast iv infusion of 3% nacl500ml for patient who has low sodium level	(71)62.8%	(32)28.3%	(10)8.8%	1.46 $\pm$ .655

(Table 4.2) shows Nurses Knowledge about Administration of High Alert Medication. On asking a question, "Fast IV pushes 1: 1000 epinephrine 1 ampule for patient who has mild allergic reaction", among the respondents' (n=81)71.7% stated Yes, (n=30)26.5% stated No, (n=2)1.8% were answered in don't know with mean and SD of 1.30 $\pm$ .498. The participants were asked a question "When an emergency happens, fast IV push 10% CaCl<sub>2</sub> 10mL in 1–2 min", where (n=48)42.5% said Yes, (n=60)53.1% said No, (n=5)4.4% were stated in don't know with mean and SD of 1.62 $\pm$ .572. On asking a question, "10% calcium gluconate 10% Cacl are the same drugs are interchangeable." among the

participants (n=33)29.2% were mentioned Yes, (n=65)57.7% mentioned No, (n=15)13.3% were stated don't know with mean and SD of 1.84 $\pm$ .635.

Table 4.2 shows Nurses views about a question, "Cc and ml are the dosage expression for insulin injection", where (n=21)18.6% participants were replied in Yes, (n=79)69.9% were answered in No, (n=13)11.5% were stated don't know. On asking a question, "Insulin syringe can be replaced by 1ml syringe", among the respondents (n=44)38.9% were answered in Yes, (n=58)51.3% stated in No, (n=11)9.7% were mentioned as don't know.

Nurses views about “When an emergency happen such as ventricular fibrillation, fast 15% KCl 10ml given IV” Among the participants (n=46)40.7% stated Yes, (n=53)46.9% were stated No, (n=13)11.5% stated don’t know with mean  $1.71 \pm .666$ . In response to another question, “15%kcl is better added to ringer lactate solution for rapid infusion in case of dehydration” the participants responded as below. (n=60)53.1% answered in Yes, (n=45)39.8% answered in No, (n=8)7.1% were answered in don’t know with mean and SD of  $1.54 \pm .627$ . In response to a question,” Fast iv infusion of 3% nacl500ml for patient who has low sodium level” among the participants (n=71)62.8% stated Yes, (n=32)28.3% were stated No, (n=10)8.8% stated don’t know with mean  $1.46 \pm .655$ .

### DISCUSSION:

Study about High Alert Medication knowledge aiming nurses who practice wherever in our nation state. We need to assess nurses’ awareness and knowledge regarding high alert medication in order to be capable to deliver proper education to bring up-to-date their knowledge, and moreover to avoid any inappropriate management of high risk medications that can put patients’ lives in threat. In addition, the knowledge gained from this investigation can be used for establishment of high alert medication for the purpose of guaranteeing accurate and harmless administration, and to eradicate Medicine Errors that can be a reason to harm patients.(Graham, Clopp, Kostek, & Crawford, 2008) The outcomes of this investigation will establish baseline figures about nurses’ high alert medication knowledge, so that appropriate educational and training programs can be originated. Furthermore, the outcomes of this education can aid policy makers in academic circles to determine the appropriate courses to offer learners in nursing schools, with respect to the usage and handling of high alert medication.

The response rate in our study was 97%; this is a very adequate answer rate, and is higher than a similar study in Taiwan, which had a response rate of 79.2%.(Hsaio et al., 2010)

In this research among all the participants 57.2% participants did not identify that 10%  $\text{CaCl}_2$  should not be administered as rapid intravenous push.  $\text{CaCl}_2$  injection should be administered gradually. Furthermore, it is observed that 70.8 % of participants did not distinguish that 10% Ca - gluconate and 10%  $\text{CaCl}_2$  are not interchangeable. These outcomes established that nurses had

insufficient awareness and knowledge about medicines and their administration. These results are similar and somehow greater with the results of another study of Nadosi and fellows who found that 74% of nurses in the north England had inadequate knowledge. (M. E. Ndosi & Newell, 2009)

Insulin among the other medicine is most significant high alert medication, as insulin over or low dose due to inadequate high alert medication awareness can lead to fatal outcomes. Usage of insulin syringe for the administration of insulin is very important.(Sa’ed et al., 2019) 38.9% participants swapped an insulin syringe with 1 mL syringe. These results are in line with another study done in Palestine by Sa’ed H. Zyoud and colleagues where 32.1% of nurses replaced an insulin syringe with a 1 mL syringe. (Sa’ed et al., 2019) It is acknowledged that injection of potassium chloride (KCl) intravenously at extremely high speed can be a reason to cardiac arrest; it has been stated as a reason of death world-wide. (de Melo, Costa, & Soares, 2014) Supportively, only 41.7% of participants understood that 15% potassium chloride (KCl) should not be administered as a fast IV push, although there was a higher proportion of participants who did not identify this. An earlier study have suggested that nurses should not have allowed free access to 15% potassium chloride (KCl) and this medicine should not be kept in nursing units (Lan et al., 2014). It is important to conduct the educational programs for nurses regarding its deadly effects and about its appropriate administration.

Obstacles Faced By Nurses during Administration of High Alert Medication. It is really significant to understand the most frequently faced obstacles that lead the participants to make those mistakes. Results of this study presented that the most common obstacle that are encountered by the participants is when administering high alert medication was conflicting opinions between the nurse and doctor (n=37)32.7%. Furthermore, participants responded about Insufficient knowledge, among the participants (n=45)39.8% were agreed that they have insufficient knowledge, (n=67)59.3% were stated No with mean of  $1.61 \pm .508$ . Nurses views about another obstacle that is “Confused prescription” Among the participants (n=58)51.3% were stated Yes, (n=54) 47.8% were stated No, with mean  $1.50 \pm .520$ . Results of current study are parallel with the results of another study where conflicting views between the nurse and doctor are 37.9%. Furthermore, 22.9% of



respondents believed that confused prescription was another obstacle. (Sa'ed et al., 2019)

### CONCLUSION:

Majority of the participants were moderately knowledgeable about Administration of High Alert Medication and its regulations. Outcome of current study deliver confirmation that nurses have deficient knowledge of high alert medication and its administration and regulation. Deficiency of knowledge was the significant obstacles that nurses faced during administration of high alert medication. Participants reported that conflicting views between nurses and doctors, and the lack of established standard operating procedures for high alert medication, were the most commonly encountered obstacles during administration of high alert medication these contribute to the possibility of Medicine Errors.

### Limitation and Recommendations:

- This study was limited to a small population and limited setting where few individuals were studied. The sample cannot be a true representative for large population like province and country therefore cannot be generalized. Such studies need to be conducted on a larger scale.
- We suggest that every hospital should begin its own list of high alert medication and this list should be updated frequently. Every hospital should also establish standard operating procedures (SOPs) for administration and regulation of high alert medication.
- Convenient sampling was applied in data collection process where as the probability sampling method can enhance the induction of different strata of the participants.

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